WASTE REDUCTION

Criteria for Evaluating Management Options Available to Government

Prepared by
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for the
Waste Management Advisory Board

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INTRODUCTORY NOTE BY THE WASTE MANAGEMENT ADVISORY BOARD

This report was commissioned by the Waste Management Advisory Board as one input to the Board's ongoing work on the process of strategic planning in the waste management field.

It is a complete analysis of that portion of the work which the consulting firm of Boston Gilbert Henry Associates Ltd. was asked to do, but it should be clearly understood that it was not intended to cover the whole field, either in terms of subject matter or process functions. It should be seen more as an internal working document.

Nevertheless, the Waste Management Advisory Board felt it would be appropriate and useful to publish this report, because of its practical and thought-provoking contribution to the strategic planning process. Hopefully, it will prove useful to others engaged in similar work.

R. H. Woolvett
Chairman

I N D E X

PURPOSE: THE ROLE OF A POLICY COMPENDIUM IN THE STRATEGIC PLANNING PROCESS

If one examines the problem of strategic planning in the waste management context it quickly becomes apparent that the articulation of policy alternatives is only one element in a complex decision making process.

Strategic Planning for a functional area on which government policy has an impact can be schematically represented as in Fig. 1.

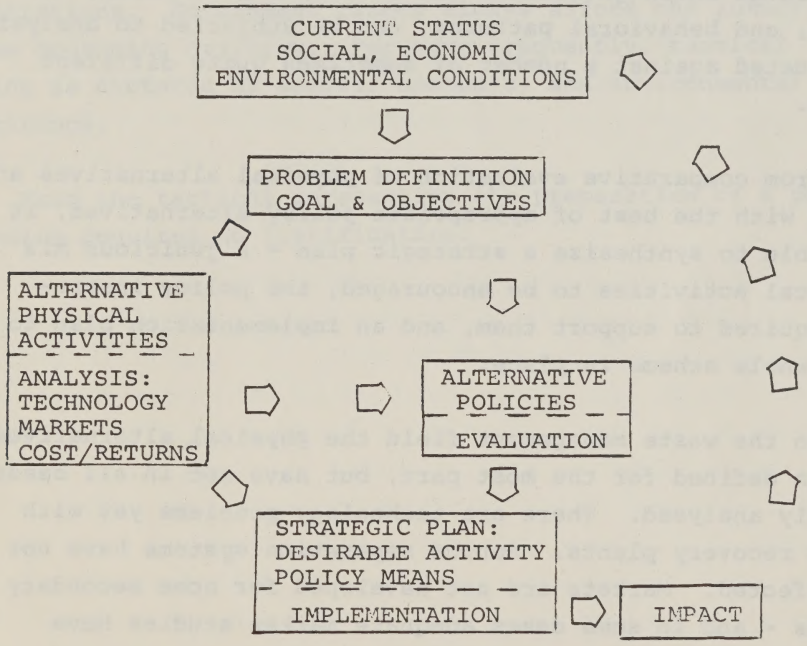

FIG 1

The current status at any given time of social, economic and environmental conditions provides the basis for defining the problem. Goals and objectives can be formulated from the problem definition, and thereafter the process breaks into two separate but related streams.

On the one hand, the "physical activity alternatives" can be defined and analysed from the view point of technology, markets, costs and returns.

On the other hand, "policy alternatives" - the instruments through which government can influence production, consumption, and behavioral patterns, can be subjected to analysis and evaluated against a number of sometimes quite different criteria.

From comparative evaluation of physical alternatives and matching with the best of appropriate policy alternatives, it is possible to synthesize a strategic plan - a judicious mix of physical activities to be encouraged, the policy instruments required to support them, and an implementation plan to put the whole scheme in place.

In the waste management field the physical alternatives have been defined for the most part, but have not in all cases been fully analysed. There are technology problems yet with resource recovery plants. Source separation systems have not been perfected. Markets are not developed for some secondary materials - and in some cases adequate market studies have not even been done.

Our knowledge of the viability and feasibility of some of the physical activity alternatives is insufficient to allow a comprehensive and reliable comparative analysis among them.

Because of this, any treatment of the policy alternatives, must be of necessity, somewhat constrained.

This problem of dealing with only one of the two decision streams has surfaced many times in this paper. However, the constraint has not been sufficient to negate the justification for preparing a policy compendium. In fact, the most attractive of physical alternatives may be rejected if subsequent analysis shows that there are no policy options available that would facilitate its implementation.

All of the foregoing has been addressed to strategic considerations. Government cannot always afford the luxury of time consuming overview. Far more frequently, tactical planning is dictated by social, economic, and environmental circumstance.

From the tactical perspective the preparation of a policy compendium requires no justification.

1.0 PROBLEM DEFINITION

The root of the environmental problem is that our social/political/economic system too seldom requires us to assess the impact of our actions on our collective environment. In particular, the governing economic system which has evolved in our contemporary industrialized world allows individual externalization of social and environmental cost. When a significant part of the "global costs" of an action can be displaced upon the rest of society, an activity which is not in the best interest of all may become highly attractive in economic terms to the individual.

Stated in these terms, the problem then becomes one of defining government actions that might alleviate the waste management problem through appropriate and acceptable modification of the existing system.

1.1 Policy Aims

Although government actions may take a wide variety of forms, most policies have a common objective of minimizing environmental damage. In terms of waste management, this can be translated into three basic aims: reduction, reuse, and reclamation. The most effective mode of attack may be to reduce the absolute amount of solid waste by changing the wasteful habits of consumers and the packaging practices of producers, but the difficulties of introducing such fundamental social changes are obvious. Alternatively, the packaging component of the solid waste stream can be attacked by salvaging the packaging before it enters the waste stream and refurbishing it for reuse in its initial function. The scope of such policies may be limited and the costs of operating effective programs are high, but there are obvious benefits to be gained in terms of both waste disposal and consumption of raw materials.

Certain environmental improvements can be accomplished not only from reducing the total amount of waste, but also through reclamation. This may take the form of separation of similar materials before they enter the waste stream (i.e. source separation), or separation of certain materials from the mixed solid waste (i.e. resource recovery). The scope of such practices is also narrow due to technological limitations and high costs of developing sophisticated systems. It is also important to realize that these basic modes of waste reduction are not mutually exclusive public policy alternatives; and on the contrary, a successful environmental strategy is likely to involve all three principles (i.e. reduction, reuse, reclamation).

1.2 Policy Means

Most public actions aimed at reducing solid waste and its associated impact on the natural environment can be broadly classified under four categories: fiscal, regulatory, educational, and governmental (i.e. active government participation) policies. In general, governments have traditionally adopted a more regulatory approach to deal with environmental issues. In relation to packaging, this may take the form of restricting or banning certain packaging forms or materials; imposing a variety of operational standards on the industry; changing certain waste collection and disposal practices; or even introducing a system of assessing and approving all types of packaging.

In other cases, governments have preferred to pursue a more voluntary strategy and promote educational programs. Such policies may take the form of issuing packaging guidelines on the environmental offensiveness of different materials, encouraging industry to co-operate by not using packaging as a marketing tool, or general educational programs to make the public aware of wasteful practices.

Alternatively, the government may take a fiscal route by tackling the problem with a set of taxes and subsidies. Fiscal measures may be very narrow in scope in an attempt to complement other policies by specific revenue generating schemes or operating subsidies; or they may be developed into a comprehensive strategy based on, for example, the "polluter-pays-principle". Since this report takes a special interest in this principle, fiscal approaches will be examined in more detail in relation to the "polluter-pays-principle". Following a general discussion on this principle, specific fiscal, regulatory, educational, and other governmental policies will be investigated in more detail.

1.3 Polluter-Pays-Principle

The events of the past decade in North America clearly suggest that there is a growing environmental consciousness and even some recognition of collective responsibility over environmental concerns. However, there still does not seem to be any profound changes in the patterns of individual behaviour. The statistical evidence on the contribution of packaging to the flow of urban solid waste clearly indicates that the consumers (and producers) have not been influenced by the perception of the more general problem at the level of individual decision-making. The problem then is to translate this collective awareness of the rather wasteful habits of the "consumer society", to the level of individual action with the ultimate aim of influencing the patterns of consumer behaviour in the direction of the "conserver society".

In general, waste collection, transportation, and disposal costs are not reflected in the market prices of products that partially or totally end up in the waste stream. Waste management costs are to a large extent covered by general

public revenue and the principal generators of waste very rarely assume the financial responsiblity for the duties they impose on the public authorities. In most cases, industry neither has any incentive to consider disposal problems of its packaging practices, nor any reason to take such problems into account when it introduces new products or packaging techniques. Similarly, consumers are never made aware of the ultimate consequences of their actions when they contribute to the waste stream, and there is no mechanism that provides them with a direct incentive, other than perhaps a moral obligation to adjust their consumption patterns in accordance with a less wasteful way of life. It may be desirable, therefore, to develop a scheme where the generators of waste bear the full cost of waste disposal; in other words, the institution of the "polluter-pays-principle".

In theory, such a system will give both consumers and producersa chance to assess the full consequences of their actions, and also provide a direct monetary incentive to reduce packaging waste and its associated environmental impacts. It can also be argued that the application of the "polluter-pays principle" is more "equitable" since the individuals pay the full cost of their actions, and more "efficient" from a resource allocation point-of-view since the internalization of externalties (i.e. in this case, all the direct and indirect costs of waste disposal) remove the imperfections from the market.

The costs of collection, transportation, and disposal are only the most visible and easily measurable elements of the "total social cost" of waste disposal. There are also the indirect costs, which are quite often intangible, from effluent by-products of the waste collection and disposal process, as well as from the waste materials that fail to be collected or

properly treated. Further, there is the portion of the true opportunity cost that is not reflected in the market price of non-renewable resources that enter the waste stream. An ideal application of the "polluter-pays-principle" has to include all these social and environmental costs, but in practice, of course, there are the obvious problems of enumeration and measurement of these indirect and intangible costs.

The difficulties of implementing the "polluter-pays principle" go beyond the impasse of determining the total social cost of waste disposal. Another important issue is establishing who the real polluter is. It may be equally valid to argue that the ultimate responsibility is with the consumer who actually disposes, for example, a soft drink can into the waste stream; or to suggest that the crucial actor is the soft drink producer since he makes the choice of marketing the product in a can rather than a returnable bottle; or even to identify the can producer as the real polluter. This, of course, raises the more fundamental issue of where to levy the disposal charges. A commonly proposed guideline is to levy the tax at the earliest stage in the manufacturing process where the decisions concerning product and packaging type originate.

Although, under conditions of perfect competition, this principle may theoretically prove to be the most effective alternative, in practice, there is always the possibility of passing the disposal charge on to the consumer. Production decisions are not made independently of market demand; therefore, if the consumer is likely to absorb the higher price of an "over-packaged" item, a tax on packaging materials will do little more than generate revenue. In economic terms, if the price elasticity of demand for a product is low, a tax will be relatively ineffective in reducing its consumption. On the other hand, the public may be reluctant to accept a higher

price for the "over-packaged" product, in which case the producer will be forced to consider other packaging forms. Aside from these general guidelines, the success of a specific policy will largely depend on the identification of critical "pressure points" in the production/consumption process where the application of a fiscal measure is expected to influence decisions most effectively in the environmentally-desired direction. It must also be kept in mind that the most effective solution may not always prove to be the most practical one; and under most circumstances, practical considerations of product/package definition and tax enforcement will favour taxes levied at the manufacturing end over those at the retail level.

In addition to overcoming some of these problems, the successful implementation of policies based on the "polluter-pays" principle is conditional on the satisfaction of various other criteria. It is important, for example, that the effects of a proposed policy are easily predictable in order to ensure that the desired results are obtained and any adverse secondary effects are avoided. Similarly, measurability of impacts and flexibility become important factors in order to continuously adjust policies to achieve better results, and also in order to discontinue those policies that clearly have undesirable consequences. Perhaps, the most important condition for the successful implementation of a policy is administrative simplicity that minimizes costs of regulation and enforcement. Policies that are generally more acceptable and easy to interpret will secure a greater degree of compliance while, at the same time, reduce the degree of confrontation with those industries that choose to challenge them.

Any policy should not only provide an immediate incentive to reduce packaging waste, but also maintain a constant positive pressure to eliminate unnecessary packaging and

continuously encourage the substitution of environmentally superior packaging practices and materials. The impacts of purely fiscal policies are likely to taper off as taxes are internalized in a new price structure, but those policies that have a further educational influence will have a long lasting impact since they may create an environmental awareness as well as providing monetary incentives. Most fiscal measures are likely to be most effective in combination with other regulatory measures and even with active government participation in the waste management field. In this respect, compatibility with other policy measures becomes an important issue in the implementation of any specific policy.

Most of these considerations are equally valid for all policies aimed at reducing packaging waste and its environmental impacts, and they will be treated in a more systematic and comprehensive fashion in the next section. At this stage, however, it is important to realize the relevance of this wide range of criteria within the context of the "polluter-pays" principle since it indicates that the view of this principle as a mere form of taxation is clearly inadequate. Polluter-pays principle has far-reaching implications within a broader environmental strategy and it cannot be treated within the bounds of narrow fiscal analysis. The application of this principle is not at all incompatible with other regulatory and educational approaches to environmental policy, and in fact, its success may very well be dependent upon being complemented by policies derived from these other principles.

2.0 CRITERIA FOR EVALUATING ALTERNATIVE POLICY MEASURES

Throughout the following assessments, the "polluter-pays" principle serves as a critical evaluative tool. As already pointed out, the ramifications of the application of this principle are complex. To facilitate the evaluation of the different policies considered, a comprehensive list of criteria has been developed. Some of these constitute a more detailed and exhaustive treatment of the different facets of the principle. The remainder are not necessarily related to the principle, but are required to complete the analysis.

The criteria are broadly classified as general criteria, economic criteria, and environmental criteria. Due to the large number of factors that are included in the general criteria classification, this category has been sub-divided into planning concerns, administrative simplicity, adaptability, effectiveness, market efficiency, and distributional equity.*

Almost all of the factors within the general criteria classification are qualitative considerations. Economic and environmental factors could be treated in a quantitative fashion if the analysis were to be focused on a single policy or problem area. Because of the broad scope of this work, it has been necessary to treat these factors subjectively. Given the delphi technique used, and the range of disciplines and experience represented by the team of analysts, this subject treatment is of value for comparative purposes. In this context, it is sufficient to establish that an impact will be positive or negative and to determine that it will likely be significant or minimal.

In the analysis, each alternative was evaluated against each criterion to form a basis for the overall assessment of the option.

* See Table next page.

TABLE OF CRITERIA FOR EVALUATION OF ALTERNATIVE POLICY OPTIONS (1)

General Criteria

* Planning Concerns
  - . Acceptability
  - . Predictability
  - . Compatibility
* Administrative Simplicity
  - . Ease of Implementation
  - . Interpretation
  - . Ease of Maintenance
* Adaptibility
  - . Flexibility
  - . Measureability
* Effectiveness
  - . Decision Point
  - . On-Going Positive Incentive
  - . Conserver Education
* Fairness
  - . Maintenance of Free Market Efficiency
  - . Scope
  - . Equity

Economic Criteria

- . Consumer Impact
- . Industrial Economic Impact
- . Net Employment
- . Government Impact

Environmental Criteria

- . Waste Disposal
- . Energy
- . Scarce or Non Renewable Resources
- . Raw Materials
- . Environmental Contaminations
- . Litter

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(1) The definitions of these criteria and the development of justifications for them are covered in detail in the following section.

2.1.0 GENERAL CRITERIA

2.1.1 Planning Concerns

2.1.1 Acceptability

Any option to which there will be immediate and/or strong opposition is unlikely to result in workable, implemented policy. The opposition can be on the part of industry, a political faction, or the general population. Strong resistance to the policy can lead to a squandering of time and resources for both the government and the affected segment of the economic-social structure.

Sometimes less effective policies that do not face this resistance will, in the long-term, achieve a greater impact on waste management problems through the channeling of effort and expense into constructive implementation and application.

The marketability of an idea is a planning concern. If it is known at an early point that a specific approach will meet concerted resistance, there may be little point in proceeding any further with the analysis.

2.1.1.2 Predictability

Policy actions should be based on adequate knowledge and data. If impacts and side effects cannot be predicted with an acceptable degree of confidence, the recommendation of a specific option becomes difficult to justify. Both the political decision-makers and the affected segment of society may take exception to recommended action on this basis.

Predictability is a prime concern in the analysis and planning of policy approaches. Without evidence of reliability, the potential acceptance of recommended action is jeopardized.

2.1.1.3 Compatibility

Any specific action must be analyzed in the light of its compatibility with both existing measures and potential future approaches. Some policies, by their nature, preclude the adoption of other alternatives, or suppress their impact.

2.1.2 Administrative Simplicity

2.1.2.1 Ease of Implementation

The most meaningful legislation, regulations, or policy statements must be amenable to relatively simple implementation or they become impractical.

Where a large number of affected organizations or individuals must be notified and educated, difficulties can be encountered, particularly if use of the media is inappropriate. Similarly, if there are numerous agents responsible for the application of government policy, implementation can become arduous.

Implementation problems can also arise if the complexity of affected processes and systems in the market place are not recognized in implementation plans. Where severe disruption to existing systems will likely be caused by implementation of a policy, the analysis must incorporate such negative effects.

2.1.2.2 Interpretation

In the past, legislation and regulations have caused problems for the individuals affected because of difficulty in interpreting the law. This difficulty can be caused by legalistic language and, in this case, is hard to guard against at the policy formulation stage. Of greater pertinence, the problem sometimes arises not because of convoluted English, but rather because of inherent complexities in measurement,

or definition. A case in point is the regulation on mandatory availability of soft drinks in refillable containers. When this regulation came into effect in Ontario, many store owners contravened it because it simply was not understood.

2.1.2.3 Administrative Ease of Maintenance

An option which ranks poorly on ease of implementation and interpretation will probably also rank badly on administrative ease of maintenance. Primarily, this criterion is concerned with the difficulty of enforcement when measured against a regulatory policy; with collection, when measured against a fiscal policy. Any requirements for reporting and control, detection, prosecution, monitoring, collecting, and dealing with requests for rulings, such as exemptions, are included within this criterion.

Administrative cost is a related criterion, but has been categorized within the impact on government criterion so as to have costs and revenues included within one classification.

2.1.3 Adaptability

2.1.2.1 Flexibility

Some policy measures lend themselves to later adjustment once implementation has occurred and the impacts of the policy can be measured.

Considering the difficulties of prediction of impacts, side effects, and eventual acceptability, flexibility can be a very important criterion for assessing alternative policies.

In general, fiscal policies tend to be far more flexible than regulatory approaches. If a 3-cent-per-container tax is imposed and has unfortunate side effects, it can be adjusted

to 1¢ or 2¢ to alleviate these effects while, at the same time, maintaining some economic pressure on the container.

2.1.3.2 Measurability

Assessment of adaptability requires an evaluation of how well the impacts of an implemented policy can be measured. In both the environmental and economic areas there may be no recourse to an inexpensive data base. In many cases, it may not even be possible to develop performance indicators that would be universally acceptable. By implication a baseline from which to measure progress is also a prerequisite.

The "fine tuning" of an implemented policy is largely dependent on the feasibility of measuring impact, after the fact.

The lack of provision for quantitative feedback on action taken is probably one of the most consistent oversights encountered in the sphere of public policy development. Consideration of the need for feedback has to be initiated at the policy formulation stage. The use of flexibility as an evaluative criterion is only valid if measurability is also taken into account.

2.1.4 Effectiveness

2.1.4.1 Decision Point

In the delivery of the product to the ultimate consumer, package-related decisions are made, in most cases, at a number of levels. The package manufacturer, the producer or package filler, the distributor, the retailer, and the consumer each play a role in determining what packages become dominant in the market place.

The influence that each player has on the decision chain varies between products and locations, and often there is a critical decision point - a single level in the system where the essential power is held to determine what the packaging parameters will be.

Any policy which does not have a substantial impact on the critical decision point will probably be ineffective from an environmental viewpoint.

2.1.4.2 On-going Positive Incentive

Some policies will cause an immediate shift away from environmentally offensive products and packages. However, if, by their nature they do not exert a pressure to maintain and extend this change, then effectiveness is reduced. As an example, a minimal tax on a specific product-package may cause some initial small loss of market share. As time goes on, however, the consumer may come to accept the higher price and revert back to former purchasing habits.

The most effective policy will be one which causes an initial positive shift which improves over time.

2.1.4.3 Conserver Education

Almost every policy action in the environmental field has a specific focus - some desired change in the level of a specified form of pollution.

Though it is seldom the prime intent of the implementation of an environmental policy measure, there is a by-product in the form of environmental education. This educational side effect can be negative as well as positive and can vary substantially between alternatives.

Individual attitudes toward environmental improvement can be viewed as the sum of many impressions that one is exposed to. Government actions are only one source of these impressions, but if all environmental policy initiatives are examined from the perspective of their contribution to the conserver society - a state of collective environmentally positive attitudes, they can become the most significant source.

2.1.5 Fairness

2.1.5.1 Maintenance of "Free Market" Efficiency

Though the market place is never totally free, there is something to be said, in an industrial society, for minimal government intervention. In a competitive economy, the forces of the market place play a large role in corporate decision-making. This process can be relatively efficient and self-stabilizing.

Government actions that make use of, rather than impede, the free play of these competitive forces are more likely to result in environmentally-productive corporate decisions which will also be efficient in an economic sense. Fiscal policies tend to support this philosophy while regulatory measures, in general, tend to subvert it.

2.1.5.2 Scope

Those policies which cover the greatest number of problem products and polluters will generally be the most productive and corporately equitable.

2.1.5.3 Equity

Some measures will have a disproportionate impact on consumers in the lower income brackets. In addition to the notion of fair play, it can be seen that the environmental impact of a policy is adversely affected when higher income groups are left free to pollute because theycan afford to.

2.2.0 ECONOMIC CRITERIA

2.2.1 Consumer Impact

Higher prices for goods will be the most noticeable impact on consumers. It is also possible that some alternatives will result in necessary life style changes.

2.2.2 Industrial Economic Impact

Included in this category are the costs to industry of equipment and plant obsolescence, higher costs of production and distribution, and required investment in new equipment.

2.2.3 Net Employment

Some alternatives may lead to employment decreases in some industries, but increases in others. The total job impact across the resulting system should be considered.

2.2.4 Government Impact

Both the costs of administering a policy and the revenues to be derived from it, directly or indirectly, should be evaluated.

2.3.0 ENVIRONMENTAL CRITERIA

A proposed policy must provide net environmental gains through at least one of the following criteria:

2.3.1 Waste Disposal

A policy option should decrease the volume and/or weight of waste to be disposed of. This can have implications in land usage, waste management, and waste collection.

2.3.2 Energy

A policy option should show a net decrease in total system energy usage. Trends in the international energy situation indicate that this resource should receive special attention.

2.3.3 Scarce or Non-Renewable Resources

A decrease in the consumption of these more critical resources is desirable.

2.3.4 Raw Materials

In general, a reduction in the use of raw (or virgin) materials will result in reduced quantities in the waste stream.

2.3.5 Environmental Contaminations

A policy option should decrease the potential for biological harm (including air, water, and land pollution).

2.3.6 Litter

A policy option should result in a decrease in the potential for litter. Often, the satisfaction of other environmental criteria results in an improvement in the litter situation.

3.0 POLICY OPTIONS

3.1.0 FISCAL POLICIES

Fiscal policies are aimed at providing incentives to reduce waste and its impact on the environment by changing relative prices of materials or products through a set of taxes and subsidies. Since the impacts of fiscal policies are diffused into the economic system through the price mechanism, the fiscal approach to environmental issues is generally the most compatible one with the principles of a market economy. This, however, should not suggest that the fiscal route is always the most effective means of tackling waste management and environmental problems.Under certain circumstances, the effects of a fiscal measure can easily be internalized in a new price structure with very little impact on the existing production and consumption patterns; and in general, the policy-maker can attach little confidence to the predicted results of a specific fiscal policy. On the other hand, however, it must be recognized that there is always the possibility of adjusting tax and subsidy levels in order to achieve the desired objectives. In the long run, this flexibility may prove to be the key to the achievement of significant environmental gains through fiscal measures.

In general, fiscal measures offer a high degree of compatibility with other policies since they avoid complex rules and regulations. There may be certain administrative requirements associated with the implementation of fiscal policies, but nevertheless they are likely to rank high on this criterion in relation to other policy actions - especially regulatory measures. If the taxes and subsidies are set at socially acceptable levels, it will be fairly easy to achieve a high degree of compliance. In general, fiscal policies are simple to interpret. Difficulty of interpretation of government policy has, in the past, led to significant resistance from special interest groups.

Fiscal measures have little educational value in raising the level of environmental awareness. In time, since the public is likely to get accustomed to the new prices, it is difficult to provide an on-going positive incentive through purely fiscal means.* In this respect, there may be exceptional policies, such as residential garbage collection fees, but the success of the fiscal approach to environmental problems in general is likely to depend on complementary, informative, and educational programs.

3.1.0 Taxes

Taxes are the most commonly used fiscal measures and they constitute the prime means of application of the polluter-pays principle. The economic justification for environmental taxes lies behind the argument that acknowledges the presence of externalities in the economy and the need to internalize them in the pricing system for a more efficient allocation of resources. In other words, a tax must be levied on all activities to cover the costs - both environmental and social - that they impose on society. If the proper amount of this tax can be determined and levied on the real polluter, then a greater degree of economic efficiency and distributional equity will be achieved; and the polluter-pays principle will be satisfied.

As indicated earlier, there are, of course, the practical difficulties of measuring total social cost, determining the polluter, and defining the proper characteristics of the product that reflect its environmental offensiveness (i.e. weight, volume, energy content, etc). Even if the

*One exception can be found in the U.S. scheme for increasing gas mileage on American cars. The standards are scheduled to be tightened every few years to provide an on-going incentive. A second type of exception arises if there is an alternate product which remains untaxed. This will only hold true if substitutive demand does not cause a price increase which wipes out the price differential.

prime polluter can be identified, a tax levied at that stage may not be the most effective from an environmental point-of-view; there is always the danger of it being simply absorbed or passed on in higher prices with little influence on total demand, and hence on the environment.

On the other hand, it must be realized that a properly designed tax always has the potential of promoting more environmentally desirable products and practices. Unlike regulatory restrictions or bans, taxes offer both the consumer and the producer the freedom of choosing between products according to their preferences. In other words, though taxes may not offer an absolute certainty of environmental improvement, they do provide an incentive for it.

Taxes are very flexible policy instruments in the sense that they can be applied in a variety of forms, and at levels variable over time at different stages of the production/consumption process to achieve a wide range of objectives. They also have significant advantages from an administrative point-of-view. They can provide a rich source of revenue with a relatively modest administrative machinery to undertake the tasks of enforcement and collection. However, it is important to identify those taxes that are designed purely to generate revenue, but provide almost no incentive for environmental improvement.

Another important issue to consider in the analysis of taxes is the income distributional impacts. For example, certain taxes such as disposal fees collected from residents will be regressive while the effects of disposal charges on packaging materials will be similar to sales taxes (i.e. less regressive).

The following section deals with all of the options considered which are primarily tax measures.

These include:

- Disposal Fees at Landfills and Incinerators
- Disposal Fees at Point of Collection
- Industrial Waste Propensity Tax
- Tax on Packaging Materials
- Product Class Standards and Penalties
- Tax on Containers

3.1.1.1 Disposal Fees at Landfills and Incinerators

This option entails the collection of a fee at the disposal facility based on the weight of waste handled. The fee is intended to cover some part of the costs of disposal, but can also include the broader social costs of solic waste generation.

The resulting charge may be waived for users who practice source separation or other means of reduction/reclamation. This exemption is intended to provide added incentives for the development of schemes that reduce waste quantities going into disposal facilities.

If the disposal fee is universally applied (i.e. at all disposal facilities), it becomes the widest in scope of all options. All materials that end up in the waste stream contribute to the charges that are levied.

Some incentive is provided for municipalities to initiate home composting and source separation programs, but this is highly dependent on the level at which the fee is set. Exemptions, on the basis of these programs, obviously will accentuate this incentive.

The fee can provide a substantial source of revenue per administrative dollar expended in fee collection, monitoring, and enforcement; again, depending on the level of the fee. The existence of exemptions creates additional administrative complexities.

Because the fee will largely be collected only from municipalities and private haulers, its impact will be limited. Commercial and industrial waste generators may, in some cases, react to reduce their costs of disposal, but the private citizen will probably not be affected. The refuse collection tax levied by the municipality is only one small element in the total tax assessment and the average householder will not notice any increases. The apartment dweller's cost of refuse collection is buried in his rent, and any increase due to higher prices for private haulage are again insignificant in comparison to total rent. In both cases, there is almost never any indication of the exact portion of the municipal tax or rent which is allocated to refuse disposal.

In this sense, the tax is somewhat removed from the waste reduction decision point. Some consumers may eventually become aware of a tax related to the weight of solid waste, but they probably will not relate this to their own product-package purchasing decisions.

In large measure, this option does not conform to the "polluter-pays" principle. The manufacturer and retailer are not responsible for consumer packaging disposal costs and the consumer is neither aware of them, nor capable, individually, of reducing them.

An in-depth group analysis* has been carried out on disposal fees at two levels: 25 cents/ton and $3.00/ton. The lower level was chosen, both because it is the actual charge now levied in California and appears to be the least

* See Appendix 1 for group analysis methodology

that any reasonable authority would apply. The higher level was chosen because it represents approximately 10 percent of the present costs of collection, transfer, and disposal in Central Ontario and, as such, represents a level of some significance to the disposer of wastes.

The analysis ranked the 25 cents/ton disposal fee the highest of all options (excluding the do-nothing alternative) in terms of Administrative Concerns*. In terms of Fairness*, the 25 cents/ton disposal fee ranked as high as any other option with the exception of the do-nothing alternative.

In terms of both Effectiveness* and Environmental Impact*, the 25 cents/ton disposal charge was ranked as the poorest of those alternatives evaluated.

In terms of revenue generation, a disposal fee of 25 cents/ton would result in no more than $2 million gross revenue per annum at present generation rates, assuming universal application of the measure. Against this must be assessed the costs of a larger bureaucracy, and the necessary investment in weigh scales at every disposal site in the province. The net revenue on a present-value basis would be insignificant.

Group analysis of the $3/ton disposal fee ranked this option fairly high in terms of Administrative Concerns, but well below the ranking for the 25 cents/ton option. In terms of Effectiveness, it was given a negative ranking, but did not fare as badly as the lower disposal fee. From the point-of-view of Environmental Impact, it is a neutral option (no effect).

* See section on Criteria for the individual components of each classification.

From a provincial revenue viewpoint, a disposal fee at the $3/ton level could yield a significant return in the order of $20 million per year. Before this figure could be verified, a detailed system for administering the scheme would have to be developed, and a feasibility study covering the required investment should be carried out.

In summary, disposal fees at any level are relatively easy to administer. They are almost completely ineffective at lower levels and are only indirectly and modestly so at higher levels.

As the sole component of a provincial waste management policy, they are inappropriate. However, in conjunction with other options, disposal fees could play a useful role, if there is a need to generate revenue for the support of a comprehensive waste management strategy. This latter case seems to be the prime motivation in the California system.

3.1.1.2 Disposal Fees at Point of Collection

This measure entails the imposition of a waste collection charge at the point of pickup. The amount of the charge levied is more or less in proportion to the amount of waste produced. The focus of this option is on the owner of the individual waste-producing residence. To be workable, this alternative would require the establishment of a standard collection unit and some system of recording and billing.

The most positive aspect of point-of-pickup charges is that they represent a direct monetary penalty to the householder who produces waste, and as such, serve a significant educational role. This may lead to some reduction in the municipal waste stream. On the other hand, this program could lead to the illicit disposal of wastes.

The over-riding concern about this approach is the administratively complex and costly system that would be required. The costs involved in relation to the revenues expected would make the system inefficient. As well, some abuse in terms of recording waste collected might be expected.

It has been reported that the City of Seattle, Washington is carrying out an experimental program at the present time which could shed more light on the problems and effectiveness of this approach.

Waste Collection is within the jurisdiction of the municipalities. Provincial initiatives in this area however could probably be effected by tying some part of grants to municipalities to the existence of point of pickup charges.

3.1.1.3 Industrial Waste Propensity Tax

Manufacturers, wholesalers, distributors and retailers of products which tend to be waste-generating are assessed a tax on the basis of either sales volume or number of employees. This policy is now in force in Connecticut and California. In both jurisdictions, it is a graduated tax.

It is a means of generating revenue at low cost. At the levels seen in the two jurisdictions where it is employed, it would be considered a nuisance tax by most companies. It is not particularly equitable and, from an environmental viewpoint, it would seem to be completely ineffective. At much higher levels, it could start to have some environmental impact. Because of the very broad range of application (many companies and products) and lack of focus (no discrimination against worst packaging forms), it could be expected that higher levels of this form of taxation would result in spurious side effects. These could include lay off of employees to allow qualification for lower tax rates, and abandonment of specified products rather than changes in offensive packaging.

One of the dangers of any ineffectual measure such as this one, is that it may preclude the adoption of more effective policies. Any industry which is subjected to it can claim that they have "paid their dues" and should be freed of any further government intervention.

3.1.1.4 Tax on Packaging Materials (Disposal Charges)

In concept, these taxes are placed on the basic raw materials which end up in the waste stream, usually as some form of packaging. These charges are usually considered on a material weight basis, but could also be levied on the basis of contribution to offensive packaging forms, net energy content, or material value. The following comments apply essentially to a tax based on material weight.

This option lends itself to a number of modifications. Suggestions have been made in the past to use a part of the revenues collected to compensate municipalities for their waste handling costs. It has also been recommended that exemptions related to reclaimed material content be allowed. This variation would give a significant boost to secondary material markets and prices.

Since the tax would be assessed, in the case of packaging materials, prior to forming or filling operations, the economic effects would be felt at all levels in the chain from producer to consumer. In this context, it is one of the most comprehensive applications of the polluter-pays principle among the options considered. At each level, the decision-maker (polluter) has an on-going financial incentive for either material content reduction or package substitution. It should be noted that reusable packages would carry this tax only once, so that package cost per trip can be significantly less. With a tax that is applied subsequent to the package production stage, a compensating higher price will result for both reuseable and non-reuseable packages. A raw material tax results in a price differential between refillable and throw-away packaging.

This in turn provides the consumer with an ongoing incentive to adopt environmentally preferable purchasing habits.

This type of tax allows freedom of choice while, at the same time, it takes advantage of competitive forces in the market place. Because of the relatively small number of raw material suppliers, it should be an efficient form of revenue generation and simple to administer.

Through application to a small number of raw materials, most types of packaging can be covered. Thus, the scope of this approach can be very broad.

On the negative side, disposal charges on a weight basis do not address the problem of contribution of materials to waste volume. This is the more critical causal factor in waste management costs.

A tax based on material weight will act disproportionately in favour of high value materials. These materials tend to be high energy commodities (aluminum, plastic) and, in terms of net environmental impact, a switch from low energy materials could be counterproductive.

From a provincial viewpoint, one of the most telling arguments against disposal charges is jurisdiction. The flow of raw materials. formed or partly formed packages, and packaged finished products crosses both provincial and national boundaries. The province has the power to assess sales tax on items manufactured outside of the province (if sold at retail) from materials which would be taxable in Ontario. Such an approach, however, would obviate many of the advantages of a tax on packaging materials.

There is a divergence in legal opinion on the question of provincial jurisdiction for the application of a tax on materials at the manufacturing level. Strictly speaking this is a federal matter, but some provincial lawyers feel that there are devices

that can be applied that would permit a provincial tax which has the same effect. The Ministry of Revenue appears not to concur.

Against planning concerns, disposal charges exhibit a median ranking. As the level of these charges increase, the ranking against this criteria class decreases.

With respect to the administrative simplicity and adaptability criteria, disposal charges at all levels received a low positive ranking.

On the basis of effectiveness and fairness criteria this option ranks highly. Since the tax is most logically applied at the level of the raw material supplier, it has the effect of increasing prices right through the packaging chain and does therefore focus on the critical decision points - wherever they might be. Ongoing positive incentives will exist only as long as there are alternate packaging forms which are less heavily penalized per unit of product.

The scope of this alternative can be very broad and it makes good use of free market efficiency. In terms of equity it is a slightly regressive option and will have a disproportionate impact on lower income groups.

The economic impacts of an environmental tax on materials would be slightly negative at low levels because of costs to industry and higher consumer prices. At low levels there would be very little if any, job dislocation and government revenues would be balanced somewhat by the cost of administration. At higher levels revenue to government would be substantial, given the broad base of the tax, and the net effect on the total economy would become more or less neutral.

Disposal charges were ranked as moderately positive against environmental impact criteria. It might be noted that, on both the energy and scarce material criteria, this approach could result in a negative impact. This happens because of the low weight per unit of product that typically characterizes high energy or scarce material packaging (ex. plastics. aluminum).

3.1.1.5 Product Class Standards and Penalties

This option is similar in concept to the program now in effect in the U.S. to improve fuel economy in North America - built automobiles. Basically, for a specified product class, goals are set to achieve improvements in one or more environmental parameters. Each company is held responsible for achieving these goals in aggregate terms for each unit of product over a specified period of time. Heavy penalties are imposed on each non-complying company in proportion to the degree of noncompliance.

To demonstrate the principle, as an example, consider the soft drink industry. Suppose that, in Ontario, the consumer waste generation, on average per gallon of carbonated soft drink, is 6 lbs., and the energy used for packaging and the delivery system is 1200 B.T.U./gallon (hypothetical figures). Detailed analysis and negotiation with industry might result in setting the standards at say, 5 lbs. of waste/gallon and 900 B.T.U./gallon by 1981. Each company, before the beginning of 1981, will have to assess their product and package mix to develop a plan for meeting the objectives. There would be no government intervention other than the specification of standards and penalties. Companies would be completely free to allocate production between different sizes and types of package, and to carry out the marketing strategy that would best meet their needs.

At the end of the year, total package usage by type and weight would be reported by each company and pre-determined coefficients would be applied to calculate energy consumption. Any company not meeting the standards pays a fine proportional to the total waste or energy shortfall. The system could be implemented for one product class and gradually extended to others when proven and refined.

There should be sufficient notice of standard changes to allow firms to modify their package mix without severe disruptions.

When this option is measured against other alternatives, it ranks among the highest on environmental impact criteria. At the same time it would exhibit one of the more negative economic impacts - primarily because of high costs to industry. Intuitively this makes sense; any alternative with very high potential for environmental improvement should show a corresponding cost somewhere within the economic structure.

On the basis of fairness, the standards and penalties option is among the best of the measures evaluated. It can be made to apply to a wide number of products, it allows the players in the marketplace freedom of choice within their ability to pay the penalties and it should be reasonably equitable between consumer income groups. It is also among the most effective alternatives. A significant ongoing incentive to improve would exist and the measure would be directed (for most products) at a critical decision point. The educational impact should be significant. At least in the initial implementation of this measure, distributional inequity among products would occur. This problem would be overcome as more product classes became subject to the program.

Against adaptability criteria, the option is neutral. High flexibility must be weighed against the complexity of measurement.

On the grounds of administrative simplicity, this alternative is slightly negative, or about the median of all policy options considered under this criterion.

Against planning concerns, evaluation of this approach becomes somewhat conditional. Any industry which is placed on a standards and penalties program could not fairly be subjected to other measures, so that compatibility would seem to be poor.

If however, a number of industries were asked to participate in voluntary programs, the prospect of having standards and penalties imposed as a result of poor performance could serve as a strong inducement to co-operate. Assuming that standards are set at reasonable levels, the predictability of impact of this policy option is directly related to the scale of fines that are imposed.

Though no government action is usually the preference of industry, this policy initiative could be "relatively acceptable" to many firms. A common complaint from industry executives about Ontario's voluntary program in the soft drink area in 1975 and 1976 was that they were not being presented with "targets" that they could plan against. This option has the advantage of presenting "targets" with a very clear articulation of the penalties for failure to achieve these goals. At the same time, industry is left free to develop their own approaches towards the goals.

The Environmental Protection Act gives the province the power to establish pollution standards and to establish fines for non-compliance. However, the form of pollution in this case is much more indirect than say the dumping of contaminants into a stream. Before this option could be firmly claimed to be within provincial jurisdiction, competent legal review of the legislation would be required.

3.1.1.6 Tax on Containers

This type of tax can be applied in many forms. The following discussion will apply to a tax levied at the point of manufacture. All consumer products sold at retail in containers would be covered with a specified charge per container. If a 1¢/lb. charge were levied only on food and beverage packaging, anticipated provincial revenues should exceed $15 million per year, depending on what materials might be covered. In net terms, however, this substantial sum represents no more than a transfer of money from industry and consumers to the public purse.

This measure should lead to a greater reduction in waste volume than would an equivalent materials tax based on weight. Packaging costs for lighter containers such as the excelopak (plasticized paperboard) would be disproportionately higher in comparison to heavy containers such as glass bottles. There would also be inequities between product classes. As one example - containerized food prices would rise more sharply relative to the price of cosmetics.

In most other respects, this option ranks very closely to a tax on raw materials. In terms of acceptability, it might be noted that some soft drink companies in the past have proposed a container tax as a means of shifting the market packaging mix towards refillables. Compatibility with many other alternatives is reasonable, predictability is poor and becomes more so as the level of the tax rises. It is not possible to predict accurately what substitutions will occur nor, in most cases, at what level they will take place.

With regard to administrative simplicity, the ranking of this option is among the more negative of all alternatives considered. It ranks well with respect to effectiveness criteria. It ranks well with respect to effectiveness criteria in that key decision points would be subjected to pressure. The resulting higher prices for taxed containers (non refillables)

in comparison with untaxed containers would provide a continuing element of conserver education. Market shifts that might result would constitute, at least a moderate ongoing positive incentive for package fillers to substitute more desirable packaging.

Relative to fairness criteria, the option would be somewhat narrow in scope. Market Efficiency would be maintained with little expected inequity between income groups. In contrast, the tax on materials ranks much higher against both the fairness and administrative simplicity criteria.

The comparative economic impact of this measure was judged to be slightly negative. Compared to other alternatives against environmental impact, the container tax takes on a median ranking.

Variations in a basic container tax policy could include rebates for reclaimed material content, and differentiation between containers according to environmental offensiveness. Both of these modifications would offer advantages in many respects. However, in both cases, the administrative complexity of the policy would be increased, and it is on administrative grounds that the approach is weakest.

Common sense indicates that a container tax policy would be most feasible if applied against a single product or a small group of products. This is not an entirely equitable approach but it would greatly simplify the necessary administration.

The jurisdictional problem encountered with taxes on materials is also a factor when considering container taxes.

Though the weight of legal opinion seems to support the viability of a provincial tax on containers, the fact that it is questionable would indicate the likelihood of court action from those firms affected.

3.1.2 Subsidies

Subsidies may not independently conform to the polluter-pays principle, but nevertheless they are not in direct conflict with that principle; and in fact, they can be used as powerful policy tools to complement various tax schemes in an overall fiscal approach towards a comprehensive waste management strategy. If taxes are set high enough to cover total social costs, they are likely to generate a revenue base well above the direct costs of waste collection and disposal. This source of revenue can, in turn, be utilized by a subsidy program to achieve further environmental gains. Also, tax schemes usually do not discriminate between industries that have differential costs of reducing waste or of switching to less offensive materials and practices. Subsidies can be put to use to compensate those industries that have high costs of conversion or of waste reduction due to the specific nature of their production process or technological factors, and hence they can be instrumental in improving the overall "clean up effeciency".

Whether this overall strategy is adopted or not,however, subsidies are still non-coercive means of providing positive incentives and almost by definition they reduce the possibility of non-constructive resistance. A properly designed and well-managed mix of operating and capital subsidies will provide an on-going positive incentive, and also have an educational influence by encouraging industry to participate in environmental concerns. One possible drawback is that subsidies are generally narrow in scope and since they require some degree of subjective selection, they create differential incentives which may potentially be discriminatory.

There are obvious difficulties of designing universally applicable subsidy programs which may require a great deal of administrative judgement and action; in which case, of course, the complexity of programs will also entail a larger administrative machinery during the implementation stage. If subsidies are not tied into independent revenue sources such as other environmental tax schemes, they will certainly strain the public purse and invite political opposition. Large-scale subsidy programs are likely to be opposed more strongly than strategies that primarily rely on revenue generating measures, especially during times of fiscal restraint. In any event, subsidies may prove to be expensive means of tackling environmental issues and may indeed be inefficient in terms of environmental gains realized per dollar allocated to the program. Further, the results of subsidy programs are likely to be less predictable than even tax schemes, since they generally involve new and innovative activities that require a great deal of initial experience, as well as research and development. Subsidy programs may also have spurious side effects that are difficult to monitor. Except where otherwise indicated, all subsidy schemes are within the jurisdiction of the provincial government.

The Subsidy options considered in this section include the following:

- Home Composting
- Reclaimed Material Markets
- Resource Recovery
- Source Separation
- Bulk Merchandising
- Environmental Organizations
- Tax exemptions on Recycling Investments
- Reuseable Packaging

3.1.2.1 Home Composting Subsidies

Home composting could reduce the municipal waste stream by up to 25% in low density residential areas. Waste reduction of this magnitude would depend on high participation rates. The means of achieving this participation could be through the provision of free containers, intensive promotion, the distribution of educational material, and the free installation of units where required. Further research still seems to be required to establish the optimal mechanisms for inducing householders to compost. The funding of such research, preferably in demonstration communities, is also a potential form of government subsidy.

The following analysis is based on the assumption that adequately planned and funded research would lead to the definition of successful promotional approaches.

The development of home composting should be highly acceptable and compatible with other options. The removal of (wet) organics from the waste stream would actually simplify resource recovery, landfill and incinerator operations. Any program for subsidizing home composting should be comparatively simple to administer.

In terms of effectiveness, this option was ranked as the best of all alternatives; it is applied at a critical decision point (the householder), there is an ongoing incentive, and the conserver educational value is high.

On economic grounds, the approach is efficient. For example, the investment in a container can be paid off in less than three years through reduced collection costs.*

With respect to environmental impacts, this policy ranks well against other measures.

In summary, home composting is a relatively cheap and inoffensive means of significantly reducing the municipal waste stream.

* Footnote:

A reasonable container cost is probably in the order of $30, assuming large scale purchase.

The annual cost of waste handling for a family in a residential area is between $40 and $60. If 25% of the waste stream is diverted to home composting, it would appear that the container cost could be recovered in two to three years. In fact, other considerations would come into any feasibility review; the reduction in volume may allow a shift to once/week pickup with significant savings. On the other hand, a 25% reduction in volume will not necessarily result in a 25% reduction in cost - a decrease in volume which is sufficient to relieve an integral number of men or crews must occur.

3.1.2.2 Subsidization of Reclaimed Materials Markets

There has always been a well established market for the traditional secondary materials. Those materials which could be claimed from the waste stream such as glass cullet, tin cans, newsprint, and plastics have had the benefit of neither established markets nor stable prices. This problem of market and price has been one of the chief impediments to the spread of material recovery programs.

Subsidization can take the form of funding for systems development, economic and technical feasibility studies, and market research, but the most direct approach would be to place a subsidy on specified materials. The most simple administrative system would be to pay the subsidy directly to the final purchaser based on tonnage bought. A potential problem with this mechanism is that there is no guarantee that corresponding price changes would take place at the dealer, broker, and collection levels.

For glass cullet, there are only two final buyers in Ontario and for tin cans, one (at the present). To illustrate the lack of free markets, glass cullet (mixed colour) is selling in some locations in the U.S. for $45.00/Ton,* while in Ontario it brings only $25.00/Ton. To ensure that the subsidy does make its way fairly through the chain from end user to collector, government payments could be made conditional upon the establishment of a publicized fixed price.

A substantial subsidy would serve as an incentive to users and intermediaries to resolve technical and system problems that have to date prevented the establishment of stable markets. Once such a market exists and the economic viability of reclaimed materials usage is demonstrated to industry, subsidies could be adjusted to lower levels or dropped entirely.

*Prices have risen since first writing to $55/Ton.

This option ranks highly in terms of acceptability and compatibility with other options. There is a difficulty in predicting the extent to which material recovery would increase with this approach.

The policy should be simple to administer. Through adjustment of subsidy levels, it would be a relatively flexible option.

This alternative received a median ranking against effectiveness criteria, largely because it does not address the critical decision points in the generation of waste and because it would be somewhat inequitable if applied on a selective basis.

It is a relatively neutral policy on the grounds of fairness.

It would produce a slightly positive economic impact. Net employment increases and returns to industry should outweigh the costs to government.

Against environmental impacts, this approach was ranked quite highly.

To summarize, subsidy payments on reclaimed materials should be a relatively efficient and well accepted means of reducing environmental degradation. It does not conform to the "polluter pays" principle.

3.1.2.3 Subsidization of Resource Recovery

Through active participation and funding the Ontario Government is already subsidizing resource recovery at the Downsview Plant. This policy analysis is based on extensions of the present government involvement to other plants.

Of all approaches, resource recovery can be one of the widest in scope. Essentially, the total waste stream in a region where a plant is located can be processed. It allows the reclamation of some materials that could not be otherwise extracted. Though resource recovery does not alleviate collection and handling problems, it does offer a partial solution for disposal problems. Up to 80% of all waste can be converted to useable material. On the negative side, resource recovery with present technology and markets, is not economically viable. It represents the largest total system cost of all approaches, and results in the realization of the lowest material values largely because of contamination.

Resource recovery provides no incentive for reusability or packaging reduction. In fact, one of the most serious charges brought against the wholesale processing of waste is that many corporations use it's potential as an excuse to do nothing about the contribution of their products and packages to the waste stream.

This option is highly acceptable to industry but not to environmental activists. It is not particularly compatible with many other policies. The ultimate effects of resource recovery are predictable.

Administrative simplicity is high but flexibility is poor. Once the large required investment is made in a plant, there is little that can be done to adjust to changing conditions.

In terms of effectiveness criteria, resource recovery ranks very low. On fairness criteria, this approach has wide scope but it is in direct conflict with the "polluter pays" principle. It allows polluters to displace the costs of waste management on the whole of society.

The economic impacts would be negative. Costs to government are high, while the impact on industry and consumers would largely be hidden in the form of higher taxes. Net employment would increase. Net environmental impacts would be slightly positive. Waste disposal requirements would decrease sharply and the production of R.D.F. would result in energy gains but there would be no gains in any other environmental impact category.

High costs, low returns and negative educational effects seem to be the outstanding features of this option. This is borne out by the failure of a number of facilities in the U.S. over the last few years.

3.1.2.4 Subsidization of Source Separation

Source separation has been supported by provincial, federal and municipal funding over the past few years in several ways.

Demonstration projects, and research on systems, equipment and behavioural change have all been supported to some degree. These forms of subsidization are all necessary, but an approach that could eventually be more promising is the direct subsidization of individual programs based on the quantity of material removed from the waste stream. Savings in garbage collection costs and averted disposal can be even greater than the revenues realized from the sale of materials. Only when market prices are very high and other conditions are uniformly favourable can a source separation program be self-supporting. Since the vast majority of programs are initiated by volunteer groups or entrepreneurs, the cost benefits accruing to the municipality are not realized by the project operations.

In at least one municipality (East York), the operators of a source separation program are being paid a tonnage subsidy in recognition of reduced waste management costs. It is proposed that the province and municipality would share in a subsidy paid to any operator of an approved source separation scheme based on the tonnage of material salvaged and "average costs" of collection and disposal in each region of the province.

Though this suggestion does not entirely conform to the "polluter pays" principle, it does not pose a serious conflict.

Such a policy should be highly acceptable and compatible with many other alternatives. One exception would be resource recovery, and there could be incompatibility with those options which are aimed at reducing (salvageable) materials going into the waste stream.

Predictability of the effects of this policy are poor.

This approach should be reasonably simple to administer. It is a relatively flexible option and measurability would be good, since all recovered materials are weighed at the time of sale.

In terms of effectiveness, the policy ranks highly. It provides positive ongoing incentives to the collector who theoretically induces the householder to participate. It exhibits a high educational value and is equitable.

In terms of generating waste, this option is not addressed to critical decision points.

It is not a wide scope approach, since it is restricted to the two or three waste constituents which are most marketable.

Net positive economic impacts would result from application of the policy.

Against all of the environmental impact criteria, source separation ranks highly.

3.1.2.5 Subsidization of Bulk Merchandising

Fifty or sixty years ago, the sale of many consumer products was in bulk with a very low utilization of primary packaging. Since the second world war there has been a marked decrease in the number of products that are sold in bulk. The motivations underlying this shift seem to fall into two broad classifications; distributional efficiency and marketing concerns.

Packaging innovations which have been made to improve the efficiency of the distribution system have not all been bad from an environmental viewpoint. Accrued energy savings can be sufficient to outweigh the adverse impacts due to the related proliferation of packaging. On the other hand, packaging which is introduced for the express purpose of satisfying marketing objectives is usually environmentally offensive - not only because of the waste management problems it creates, but more importantly because of the undermining of traditional conservationist attitudes it causes.

There is a problem in trying to differentiate between these two purposes behind most packages. Very little research has been done on identifying products which lend themselves to bulk merchandising and even less on measuring the respective impacts that might result.

In view of this situation, the only constructive form of subsidy that could be considered in the near future would be the funding of research and support for systems development.

The recent introduction of "no frills" stores in food retailing could serve as one avenue for supportive investigation.

Other variations on a subsidy program in the future could include sales taxes on selected products with exemptions for those sold in bulk and quantity subsidies paid to retailers on bulk sales.

Lacking any existing knowledge of the economic and environmental impacts of bulk merchandising, detailed analysis is not justified at this time. The option is presented here only in the interests of a comprehensive capture of alternatives.

3.1.2.6 Subsidization of Environmental Organizations

Environmental activist groups, and privately funded environmental research organizations have done much in the past in terms of identifying emerging problems and creating environmental awareness. They have at times proposed constructive policy approaches. They have organized and operated demonstration projects and in general have filled an educational function which has largely been positive.

Because these groups are outside of the bureaucracy, they normally have few administrative constraints and can operate in a relatively efficient manner. Some of them with very little funding can be quite effective.

There has been government funding in the past on both an organizational and a project basis. It is proposed that such funding continue on a selective basis.

Because of the broad range of activities covered by these organizations, detailed analysis would be excessively subjective.

3.1.2.7 Tax Exemptions on Recycling Investments

This policy is already followed by both the province of Ontario and the federal government in the form of sales tax exemptions for some pollution control equipment. The federal government also allows 2 year write offs on some equipment required for recycling operations.

The policy could be extended to more favourable tax treatment of dividends from companies making equipment and facilities investments for the purpose of recycling.

Because of the division of powers between provinces and the central government, the effectiveness of this policy option would be much greater if exercised at the federal level.

3.1.2.8 Subsidization of Reusable Packaging

The simplest form of subsidy for most forms of reuseable packaging is a sales tax rebate. This policy has been considered in the past in Ontario and rejected. In a changing political environment it could resurface and be treated more favourably. Other forms of subsidization of reuseable packaging include capital cost grants for facilities, equipment and initial float, funding of research on process development, return systems and standard containers. Additional assistance can be provided through government education and promotion campaigns in support of reuseables and standards.

The following analysis applies to a comprehensive subsidization program consisting of a mix of the above elements but does not include sales tax rebates except where they are specifically mentioned. Only selected consumer product packaging is addressed.

Acceptability should be reasonably high except for standard containers. Compatibility is neutral - with policies aimed at reclamation, it is very poor.

Predictability is neutral except for those products which have been extensively studied in the past and in these cases this policy ranks only moderately well against the predictability criteria.

Against the administrative simplicity criteria, the subsidization of reuseable containers ranks poorly.

Against the adaptability criteria this policy exhibits a neutral ranking.

In terms of effectiveness this approach compares favourably with other options. It acts upon the critical decision points and it offers ongoing positive incentives to package producers and fillers (which should show up as inducements to consumers in the form of easier availability and usually better prices). The approach ranks highly in educational value. Distributional equity is poor unless all consumer products are included.

The scope of this program would have to be limited. Reuseability is neither economical nor practical for all products and should be considered only for those types of consumables which lend themselves to returnable package systems.

Like all subsidy options, this one is not in conflict with a free market system. It is highly equitable to lower income groups.

The economic impacts of this approach would be anticipated to be neutral; high cost to government being balanced by net labour improvement and lower consumer prices. Though net employment will eventually increase with returnable systems, the transition from throw away packaging can cause significant, if temporary job dislocation. The skills levels required in the resulting workforce would also be lower.

Environmental impacts should be highly favourable for those products which are covered. One exception may be found in the environmental contamination criteria. Past studies indicate that the washing operation required for reuseable containers can, in some cases result in a net increase in water pollution.

3.2.0 REGULATORY POLICIES

A regulatory strategy has traditionally been the most common approach in dealing with environmental issues, and solid waste management in particular. The results of regulatory measures tend to be highly predictable and there is generally a high degree of confidence that the public authorities can attach to the ability of such policies to achieve specific environmental goals. In this respect, regulations can be considered as effective means of reducing packaging waste and its environmental impacts; and more specifically, restrictions or bans on certain materials will be very effective in forcing the industry to introduce environmentally more desirable packaging forms and practices.

In general, regulatory measures are not consistent with the polluter-pays principle and they may also appear to be in conflict with the principles of a market economy. The advocates of fiscal policies, who tend to be mainly economists, will claim that a set of fiscal incentives and penalties is always superior to regulatory restrictions since they can be equally effective without intervening in the market in a disruptive manner. However, whether an overall regulatory approach to waste reduction is adopted or not, under certain circumstances, specific regulations will have important roles to play; they may be instrumental in complementing fiscal options, or they may even prove to be essential for the application of fiscal policies or securing the attainment of desired results. As indicated earlier, neither fiscal nor regulatory approaches should categorically be favoured over the other since they both have their respective roles to play in an overall strategy.

It is true, however, that a strategy that heavily relies on regulations may have serious drawbacks. For example, there is no incentive to reduce waste beyond the established standards; in other words, regulations tend to define an upper limit to the environmental improvements they aim to achieve. Further, once certain regulations are established,

there remains very little flexibility to incorporate new measures or even to change the old ones. Regulations may be open to subjective interpretations which constitutes a strong basis for certain interest groups to resist those measures they find difficult to accept.

The most unfavourable aspect of regulatory policies is the high cost of policing and enforcement, which requires a great deal of administrative effort. There may also be an unjustifiably high financial burden imposed on certain industries that may find it difficult to comply with a specific regulation. Assuming that it is desirable for those firms that have low costs of waste reduction due to the nature of their production and technology, to take the initial steps towards reducing waste, a regulatory approach may imply a low "clean up efficiency" since all firms are likely to be subjected to the same measures.

The regulatory measures considered in this section include:

- Selective Bans
- Environmental Approval of New Packaging
- Regulatory Standards
- Mandatory Publication of Packaging Assessments

3.2.1 Selective Banning of Materials or Package Types

In Ontario and other jurisdictions, bans have been placed on both materials for specified applications and on specific container types. They can in general be applied in Ontario under existing legislation by means of the proclamation of a regulation.

A ban can have a traumatic impact and for this reason bans should not be applied without sufficient warning to allow industry the time to make necessary adjustments. Phasing of a ban over a period of time can also serve to soften potential disruptions. If suitable substitute packaging is available this option can be very effective in terms of environmental impact. When directed against a well defined product class, this policy is highly predictable. Bans are not acceptable to industry, and in the past have been fought strenuously not only by affected corporations but by the unions involved.

Compatibility with other policies is poor.

This approach ranks highly against administrative simplicity criteria. A ban is relatively easy to implement, straight forward in interpretation, and aside from initial enforcement problems it requires almost no administration.

It is not a flexible policy and does not lend itself to any significant degree of adaptation other than outright abolition of the covering regulation.

The educational value of this option is limited. Once an offending package has been absent from the marketplace for a period of time public conciousness of the problem and its resolution also disappears. An imposed ban can provide a positive incentive to industry in the sense that similarly offensive packaging for other products is avoided.

It is tremendously inequitable to industry since it must of necessity be product or package specific.

Regulated bans constitute the ultimate intervention in the market place. On the grounds of economic efficiency they can seldom be justified, since they force a very specific and usually a very abrupt solution.

The economic impact of this policy instrument is extremely negative, job dislocation and industrial disruption costs being the primary manifestations to be anticipated.

The province has the power under present legislation to implement bans.

3.2.2 Environmental Approval of New Packaging

The State of Minnesota has established regulations governing the review and approval of new or revised packaging in specified consumer goods. Basically, the proponent of a new package is required to provide an assessment of its anticipated environmental impacts. The Minnesota Pollution Control Agency reviews the information submitted and either approves or rejects the item for sale within the state. A similar conception for a Packaging Review Board, with approval powers, has been previously suggested in Ontario.

In terms of environmental impact this policy is potentially the most effective of all of the alternatives considered. Depending on the detail and intensity of the review applied to proposed package innovations, this approach could offer the most significant improvement in every single environmental category.

As evidenced by the Minnesota experience, a packaging review system is not acceptable to industry. In that state the relevant legislation has been under attack in the courts ever since its inception.

Because of its very high cost for both industry and government the exercise of this policy option would preclude the adoption of most other alternatives. For this reason, it ranks badly against the compatibility criteria. On the other hand predictability is good.

Of all approaches an environmental review program is the most administratively complex. It is difficult to implement and would require a large bureaucracy to administer.

Against the adaptability criteria it exhibits a median ranking. Guidelines can be developed and adjusted to provide some flexibility to the policy.

In terms of effectiveness criteria, this alternative ranks highly. The critical decision points will in most cases be subject to review. It should be noted in this regard that the retailer, who sometimes controls the ultimate package mix in the market place, can escape the review process under the Minnesota legislation.

There is an ongoing positive incentive with this system for the producer. The cost and lost effort represented by an approval denied should ensure, in time, the introduction of more inoffensive packaging. Educational value of this approach is high and it should be reasonably equitable among producers.

The scope of application is limited primarily by the practical consideration of the cost of administration.

This option does not take advantage of the competitive forces of a free market place and is only somewhat less intrusive than an out right ban.

In summary, a packaging assessment system would be a highly effective environmental tool but would also be very costly and totally unpalatable at least to industry.

This option would appear to be within the jurisdiction of the province.

3.2.3 Regulatory Standards

There are a host of "housekeeping" regulations that become necessary to support many policy approaches. The prime intent of most of these rules is the maintenance of an orderly market place and as such they do not merit consideration as separate policies. One of them, however is relatively more important and will be considered here.

The regulation in question is the mandatory availability requirement for reuseable containers. This regulation is in force in several jurisdictions, Ontario being one of them. In essence it requires that a specified product sold at retail in non-refillable containers must also be offered for sale in refillable containers.

This policy is reasonably acceptable, having already been applied in Ontario in the soft drink market. It is compatible with many other policies and its impacts are fairly predictable.

Interpretation of the regulation has caused problems with small store owners. Ease of implementation and administration have not been good, largely because of the interpretation problem and the large number of retailers that are affected. It is not a particularly flexible policy, but measureability has been high.

Against effectiveness criteria this approach ranks well. An ongoing positive incentive is provided to the consumer in that a lower priced and environmentally preferred package is consistently available.

The focus of the regulation is on the retailer who has in the soft drink area in the past constituted the critical decision point. Given the power that is held by the large retail chains, this situation will also hold true for many other foods and beverages.

If this policy is applied to a complete product class it is reasonably equitable across industry. The efficiencies of market place competition are not violated with this approach. In the past, a free market has not existed where retailers refused to stock refillable containers.

Scope is limited. This policy option has a high educational value in that it forces the industry to maintain the presence of an alternative to throw away packaging.

Economic impacts on balance appear to be positive. The negative impact on industry should be outweighed by lower prices to consumers and net employment gains.

The net environmental impact of this policy is positive, but because of limited scope it may not be substantial. The most significant environmental gains should be anticipated in the litter category because of the types of product to which the regulation can be applied.

In summary, this regulation should not be viewed as a primary component of a waste management policy. Limited scope of application and modest anticipated environmental gains are its chief drawbacks. As a supportive tool in regulating the market place a case can be made for its inclusion in a comprehensive strategy.

3.2.4 Mandatory Publication of Packaging Assessments

This option is a variation of the Minnesota Environmental Assessment System. It would require the proponent of a new or revised package to submit the same assessment that would be demanded under the existing Minnesota legislation. The government, however, would not accept or reject the package but would file a public notice that the assessment had been received and would be made available to any interested citizen.

A concerned group or citizen would then be free to oppose the proposed package at their own discretion and expense.

This approach would avoid the development of a cumbersome bureaucratic machinery to deal with packaging assessments. The effectiveness of third party opposition, without government support, is questionnable, but many firms would probably not risk the bad publicity that would surround truly offensive packaging.

Such a policy would no doubt be opposed by industry on the grounds of confidential information being made public. Acceptability and predictability are both poor for this approach. The policy is slightly more compatible with other options than the Minnesota legislation would be.

In terms of administrative simplicity, a mandatory publication of packaging assessments would be slightly less difficult to implement and far simpler to administer than the Minnessota system.

Against effectiveness criteria this policy ranks slightly below a government approval system in all categories.

The scope of application could be far broader since the government cost constraint would be removed.

The environmental impact of this option would be far less than could be expected with an approvals policy but it would still be positive.

Costs for industry and environmental organizations would remain high.

To summarize, this approach should be less expensive and simpler than the Minnesota policy but it offers none of the quarantees of that system and overall does not rank as highly.

3.3.0 EDUCATION AND VOLUNTARY MEASURES

The alternatives considered under this heading include:

- Voluntary Industry Programs
- Publication of Waste Management Costs
- Packaging Guidelines
- Direct Public Education

3.3.1 Voluntary Industry Programs

Ontario instituted a voluntary program in the soft drink industry between March 1975 and March 1976. The stated objective of this program was to stop the trend to throw-aways and return the refillable soft drink container to a prominent position in the market place. Other than stating the goals and discussing the governments aspirations and intentions, it was left to industry to develop their own program.

With respect to the stated goal, the voluntary program in Ontario is generally conceded to have failed. (Subsequently, a program with certain regulatory features was instituted.)

Manitoba has also had a voluntary program in the soft drink industry with the same objectives. Both government and industry officials in that province feel that the program is successful.

The prime difference between the two provincial program outcomes seems to be not in approach or content but in the industry structures in the two provinces. In Ontario, the industry is characterized by a large number of participants in the market place, both producers and retailers. The associations that represent the container manufacturers, the bottlers and canners, and the retailers are powerful lobby groups with disparate interests.

In Manitoba, the industry is dominated by a single bottler who was willing and able to collaborate with the government in making their program work.

In retrospect it would appear that a successful voluntary program should exhibit the following attributes;

* control of the market place is not widely fragmented among many divergent interests.

* goals and objectives are arrived at jointly by government and industry. Targets are established and agreed to by those sectors of industry who will be responsible for implementation.

* necessary government supportive action is defined. If required, housekeeping regulations are put in place.

* the means of monitoring progress are developed before the program commences, and feedback mechanisms are established - including review points.

* alternate government action in case of program failure is clearly spelled out

If Ontario's 1975 voluntary program is viewed in the broader context of being one stage in a long term government attack on the packaging problems within a specified product class, it need not be considered a failure.

Industry was forced to examine their own practices during the program. When the voluntary program was concluded, changes were already starting to take place. The development of the regulations that subsequently occurred, served to reinforce those changes as well as causing others to be made.

Voluntary programs are highly acceptable, but outcomes are difficult to predict. In general they are not compatible with other policies except as a prelude to alternate government action.

This policy option does focus on critical decision points and allows the market place to function as freely as industry will permit.

Scope should be limited. The educational value of this approach can be high with industry executives. With respect to the general population, a positive educational value will result, but its extent depends on the detail of program design.

Both environmental and economic impacts are program specific.

In summary, voluntary programs are among the most acceptable of all alternatives but for them to be workable, favourable conditions must exist. They are most appropriate when viewed as the first phase of longer term programs.

3.3.2 Publication of Waste Management Costs

The costs of waste management vary substantially between municipalities and in general, the average ratepayer has no conception of their magnitude. It is proposed that the province require the specification of these costs by the municipality when tax assessments are sent out. Since all municipalities receive grants from the province, the requirement would appear to be feasible in spite of the lack of provincial jurisdiction. This policy is compatible with most other approaches.

It could be costly to those municipalities that don't know their present waste handling costs and would not be very acceptable on this basis. Acceptability for the municipalities would also be poor because of the public scrutiny of practice that would result.

Predictability of impact is poor. Though municipal handling would no doubt become more efficient, environmental improvement would come about indirectly. For example, conversion to once a week pick up to reduce collection costs may cause some householders to try to reduce the waste they generate, through home composting, or changes in purchasing habits. The policy is simple to implement and requires little administration at the provincial level. From a municipal administrative viewpoint, the policy could create some hardship. Against the ongoing positive incentive criteria, this option does not rank highly and it does not focus on the critical decision points in waste generation.

It is an equitable approach and does not interfere with the functioning of a free market place.

The scope is limited to residential householders who pay municipal taxes.

This option ranks poorly overall against other alternatives.

3.3.3 Packaging Guidelines

This option entails the formulation of environmentally desirable guidelines for packaging design, and the dissemination of such material to industry. Aside from government persuasion and contemporary conceptions of "good corporate citizenship," there is no obligation placed on industry to conform to these rules. For this approach to have any impact, industry should share in the task of formulation, and industry associations should be encouraged to promote adherence among their members.

This approach has been taken in other jurisdictions, most notably in the United Kingdom.

This option is highly acceptable and completely compatible with other strategies. It should in fact be considered as a necessary adjunct to some other alternatives.

The policy, if pursued as a single component waste management strategy, is very predictable. Environmental impacts will not be significant and any anticipated gains are dependent upon internal pressures within the affected industries.

Economic impacts will not be appreciable for either government or industry.

This policy alternative does approach the critical decision points, but little ongoing positive incentive is provided. No intrusion into the free functioning of the market place is involved.

At the time of writing, the Packaging Guidelines of the Waste Management Advisory Board were considered confidential and could not be discussed.

3.3.4 Direct Public Education: Media Promotion

The Ontario and federal governments over the past few years have engaged in media campaigns designed to promote lotteries, to encourage energy conservation, and to develop higher public awareness of personal health and fitness. All have been relatively successful and each has established in some way a precedent.

However, there has never been any extensive media promotion, funded by government and aimed at lifestyle changes which are desirable from a solid waste management perspective. The focus of such promotion would be the support of very specific forms of reuse, recycling or reduction. These could include, for example, discouraging the purchase of throw away packaging, promoting source separation, or encouraging the use of refillable containers.

Such an approach could only be cost effective if it was coordinated in time and location with the programs it was intended to support. From this viewpoint it is entirely compatible with these programs.

The acceptability of a government media campaign is dependent upon the specific program being supported. Strong opposition could be expected from any firm or industry which would be adversely affected.

Predictability is reasonably good for this option and implementation is simple. The educational value of direct promotion is probably higher than it is for any other alternative.

Economic impact, largely in terms of cost to government would be significantly negative.

Environmental impacts are entirely specific to the program being supported.

3.4.0 ACTIVE GOVERNMENT PARTICIPATION

The topics discussed in this section include:

- Government Purchasing Policy
- Marketing Boards for Reclaimed Materials

3.4.1 Government Purchasing Policy

The government, through its purchasing policies, can promote the use of materials which are less environmentally offensive. The use of papers with high post consumer, recycled fibre content and lower quality requirements can be environmentally desirable.

The use of disposable containers on government property can be discouraged and pressure can be exerted on suppliers to conform to good environmental practice. A fairly substantial number of detailed elements for such a policy could be specified - many have already been proposed in Ontario.

The direct environmental impact of such a policy option is not highly significant and there are few economic impacts to consider. The prime value of this option is in the avoidance of negative education. If the government does not itself follow sound environmental practice it losses credibility with industry and the general population.

Past suggestions for the application of preferred purchasing practice for papers have met with government opposition. The stated reasons for the opposition were that one company, who is the major producer of this class of paper, would benefit at the expense of competing firms.

3.4.2 Government Marketing Boards for Reclaimed Materials

This proposal has been made in the past to the province. From a market perspective there are two basic types of reclaimed materials; those for which there are only one or two prospective buyers (glass and cans) and those for which there are a significant number of potential buyers (newsprint and corrugated). In the first classification, markets have been relatively stable for several years but prices offered have been low and in general have reflected neither commodity value nor cost of delivery. To illustrate, glass cullet is sold for $25.00 - $30.00/Ton in Ontario while the same quality material is reported to be trading for $45.00/Ton in several locations in the North eastern United States. The cost of delivering cullet to the glass plants is seldom less than $30.00/Ton. The impediments to more active trading in glass cullet appear to be both technical/quality problems and lack of assured supply. It does not seem logical that a marketing board could solve either of these problems any more efficiently than industry themselves.

In the case of those reclaimed materials for which there is a broader demand, a marketing board could conceivably play a more useful role. For corrugated, prices appear to be set somewhat arbitrarily, and with newsprint, both supply and price have exhibited extreme fluctuations over the past five years.

The prime objectives of a marketing board would be to;

- ensure a stable and continuing supply of materials for industry and an ongoing market for collectors
- provide an organized market place where prices could be established on a more equitable basis than is now possible.

This approach would be highly acceptable to suppliers and many users, but brokers and dealers in the secondary materials industry would probably offer resistance. Compatibility with other options is good but predictability is poor.

Implementation could be onerous and would require detailed feasibility study and preplanning.

A marketing board would be relatively simple to administer.

A positive ongoing incentive would be provided by such an agency - both to industrial users and private collectors.

This policy ranks highly against the market efficiency criteria. The present market is constrained and highly inefficient.

The scope of a board's activity would be limited to a few materials.

The educational value of a board would not be significant.

The net economic impact of this policy would be positive. There would be net labour gains and increased economic activity. Government costs should not be substantial providing that stock-piling is not practiced.

Against the environmental impact criteria a marketing board would exhibit a low-median ranking, most of the gains coming from reduced waste disposal.

A P P E N D I X 1

GROUP ANALYSIS METHODOLOGY

In view of the very broad range of the policy evaluation, the lack of hard data available for some alternatives, and constraints on budget, a group analysis based on the Delphi Process, was chosen as the most appropriate methodology.
The essential requirements were the following:

- establishment of the criteria for analysis
- development of alternatives
- assessment of the relative merits of the alternatives against the criteria
- weighting of the criteria

To ensure an equitable treatment of the subject matter, six individuals from a wide variety of pertinent backgrounds were picked to make up the analysis group. These included an economist, a former civil servant with extensive experience in the direction of environmental policy research, a former leader in the environmental advocacy field, an engineer, a management consultant with many years of experience in industrial market research and distributional studies, and an environmental policy researcher from the W.M.A.B.
The group met in full day sessions in a sequestered situation. Before each session, team members received a background information package and a proposed discussion format. This information package contained a rough analysis outlining the major arguments for and against each option based on literature search, experience in other jurisdictions and the subject expertise of the team members. This outline analysis was prepared by a core group of three people and served to focus the ensueing discussion on those areas of greatest contention and importance.

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Initial discussion centred around definition of terms, enumeration of the criteria and development of alternative policy measures. Once the criteria had been developed and agreed upon and the ramifications of some of the alternative policies had been explored, the delphi technique was applied in earnest.
The chosen options were measured individually by each team member against the criteria list. A scale of -3 to +3 for each criterion was used to mark the perceived advantages of the option under consideration. The scores were collected when each team member was finished and a discussion ensued to explore the individual perceptions that had led to the resultant marking.
The follow up discussion served to point out misinterpretations of the criteria, misunderstandings of the function/operation and definition of the policy options and variations in individual opinions. Where misinterpretation and misunderstanding became evident or where opinions changed as the result of follow up debate, scores were individually revised to reflect this.

After the major options were evaluated in the above manner, the criteria in the "general criteria" classification were weighted by each member of the team on a scale of 1 to 10. There was limited follow up discussion of the weighting of criteria. One significant conclusion reached in the discussion was that the criteria could not be universally weighted with precision. For some policy options a specific criterion is either not applicable or takes on a preponderant importance. Nevertheless the general results are of interest in interpretation of the analysis and are presented below:

Weight Ranking of General Criteria

High Values

1. Ongoing Positive Incentive
1. Critical Decision Point
2. Ease of Administration
3. Acceptability
4. Educational Value

Median Values

1. Ease of Implementation
1. Interpretation
1. Equity across Society
2. Equity across Industry
3. Compatibility

Low Values

1. Flexibility
2. Measurability
3. Predictability
4. Utilization of Free Market Forces
5. Scope

No attempt was made to weight the economic and environmental impacts. Responsible government decision on the adoption of any policy should be preceeded by the quantitative measurement of these factors.

The evaluation of each option against these criteria classes on a subjective basis is necessary to develop relative assessments and consideration should be limited to this comparative purpose.

One should also be cautious of "playing the numbers game" when reviewing the overall results of the delphi process. A number can be assigned to each option that has been evaluated on the basis of the rankings that have emerged from analysis and the weighting that has been derived for the general criteria. This is not really justified, given the subjective nature of the delphi technique. The prime value of the delphi approach lies in the structure and consistency that it imparts to the analytical process. It forces the exhaustive assessment of each option and in a broad fashion allows general comparison between options. A summary of the second session, showing resulting broad comparisons is presented in Table 1.

TABLE 1

ANALYSIS OF SESSION 2 - SUBJECTIVE CRITERIA

COMPARATIVE RATING	HIGH	MED.	LOW
Acceptability	25¢ Disposal Fees Home Composting Reclaimed Mat'l	3¢ Disposal Fees 1¢ Disposal Charge	3¢ Disposal Charge Envir. Approval
Compatability	Home Composting Reclaimed Mat'l 25¢ Disposal Fees	1¢ Disposal Charge 3¢ Disposal Charge $3 Disposal Fee	Envir. Approval
Predictability	25¢ Disposal Fees	$3 Disposal Fees Envir. Approval Home Composting	1¢ Disposal Charge 3¢ Disposal Charge Reclaimed Mat'l
PLANNING CONCERNS	25¢ Disposal Fees Home Composting Reclaimed Mat'l	1¢ Disposal Charge $3 Disposal Fees	3¢ Disposal Charge Envir. Approval
Implementation	25¢ Disposal Fees $3 Disposal Fees	Reclaimed Mat'l Home Composting	1¢ Disposal Charge 3¢ Disposal Charge Envir. Approval
Admin. Ease	25¢ Disposal Fees $3 Disposal Fees Home Composting	Reclaimed Mat'l	Envir. Approval 1¢ Disposal Charge 3¢ Disposal Charge
Interpretation	25¢ Disposal Fees $3 Disposal Fees Home Composting	Reclaimed Mat'l	Envir. Approval 1¢ Disposal Charge 3¢ Disposal Charge
ADMIN. SIMPLICITY	25¢ Disposal Fees $3 Disposal Fees Home Composting	Reclaimed Mat'l	Envir. Approval 1¢ Disposal Charge 3¢ Disposal Charge
Flexibility	25¢ Disposal Fees $3 Disposal Fees	1¢ Disposal Charge 3¢ Disposal Charge Reclaimed Mat'l Home Composting Envir. Approval	
Monitoring	25¢ Disposal Fees $3 Disposal Fees Home Composting Environ Approval	Reclaimed Mat'l	1¢ Disposal Charge 3¢ Disposal Charge
ADAPTABILITY	25¢ Disposal Fees $3 Disposal Fees	Home Composting Envir. Approval Reclaimed Mat'l	1¢ Disposal Charge 3¢ Disposal Charge

SUBJECTIVE CRITERIA (Cont'd)

	HIGH	MED.	LOW
ADMIN. CONCERNS (above 3)	25¢ Disposal Fee $3 Disposal Fee Home Composting	Reclaimed Mat'l	Envir. Approval 1¢ Disposal Charge 3¢ Disposal Charge
Decision Pt.	1¢ Disposal Charge 3¢ Disposal Charge Home Composting Envir. Approval	Reclaimed Mat'l	25¢ Disposal Fees $3 Disposal Fees
Positive Incen	3¢ Disposal Charge	1¢ Disposal Charge Home Composting Envir. Approval Rclmd Mat'l $3 Disposal Fees	25% Disposal Fees
Education	Home Composting 3¢ Disposal Charge	1¢ Disposal Charge Reclaimed Mat'l Envir. Approval $3 Disposal Fees	25¢¢Disposal Fees
Distrib. Equity	Home Composting Envir. Approval	1¢ Disposal Charge 3¢ Disposal Charge	25¢ Disposal Fee $3 Disposal Fee Reclaimed Mat'ls M.
EFFECTIVENESS	3¢ Disposal Charge Home Composting 1¢ Disposal Charge Envir. Approv.	Reclaim Mat'ls M.	25¢ Disposal Fees $3 Disposal Fees
Scope	25¢ Disposal Fee $3 Disposal Fee 1¢ Disposal Charge 3¢ Disposal Charge	Environ. Approval	Home Composting Reclaimed Mat'l
Invisib. Hand Intervention	25¢ Disposal Fee $3 Disposal Fee 1¢ Disposal Charge 3¢ Disposal Charge	Home Composting Reclaimed Mat'ls	Envir. Approval
Equity Across Society		All	
FAIRNESS	25¢ Disposal Fee $3 Disposal Fee 1¢ Disposal Charge 3¢ Disposal Charge	Home Composting Reclaim. Mat'l	Envir. Approval

NON-SUBJECTIVE CRITERIA

	VERY POSITIVE	POSITIVE	NONE	NEGATIVE
NET ECONOMIC IMPACT		$3 Disposal Fee	25¢ Disp.Fee Recl Mat'l M Home Com-posting	1¢ Disp.Chg. 3¢ Disp.Chg. Envir. Approval
NET ENVIRON-MENTAL IMPACT	Recl Mat'l M Envir. Approval	Home Com-posting 1¢ Disposal Charge 3¢ Disposal Charge	$3 Disposal Fee 25¢ Disposal Fee	

APPENDIX 2

Waste Management Policy as a Factor in Industrial Centralization

Packaging forms can determine the location of particular production facilities. People gravitate to locations where jobs can be found and therein lies a tie between modern packaging and the urbanization of North America.

A number of government policies have been established in Ontario in the last decade to lure growth away from the "Golden Horseshoe." It is appropriate then to examine what impact waste management policies might have indirectly on the growing centralization of our population in the Toronto-Hamilton area.

For most packaging forms and the policies that could either encourage or discourage them, the quantitative assessment of impact on centralization is too complex for a study of this nature.

One type of packaging however has had a definite and discernable impact. This is the soft drink can which between 1965 and 1976 displaced the refillable bottle from much of the market place.

Refillables are expensive to return to the plant and their use can only be justified if there is a local bottler. Cans on the other hand require a large capital investment and are cheap to ship. The distributional economics of canning operations indicate that few plants of relatively large capacity should be located centrally.

Review of Statistics Canada publications on soft drink production show that subseqent to 1965 (after the can was introduced) the number of small bottlers dropped significantly.

In 1976 there were six can filling plants, all in the Toronto area which had taken up a significant share of total production.

When one considers the plant workers, their families, and the support services they require, literally tens of thousands of people migrated to Toronto over a decade because of a switch from refillable containers. Smaller communities throughout the province lost these people when local bottlers were forced to shut down.

In general then, which policies would encourage refillable containers?

Taxes on packaging materials and on containers would both tend to support refillables as would a program of product class standards and penalties. The direct subsidization of refillables would have at least an initial impact. Bans of materials and container types would be supportive of decentralization. The environmental approval of new packaging would not cause decentralization but it would be helpful in preventing the reverse process.

Lastly, direct public education could be useful if focussed on refillables.

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